

REMARKS

This is intended as a full and complete response to the Office Action dated March 10, 2004, having a shortened statutory period for response set to expire on June 10, 2004. Claims 1-51 remain pending in the application and are shown above. Claims 52-59 have been cancelled without prejudice by Applicants. Claims 1, 2, 7, 8, 10-15, 17, 18, 20, 26, 27, 29-34, 38, 39, 41-47 and 50-51 have been amended to refer to a substrate processing chamber. Claims 1-12, 18-30, 33-42 and 45-51 stand rejected and claims 13-17, 31, 32, 43 and 44 stand objected to. Please reconsider the pending claims for reasons presented below.

Claim Rejections - 35 U.S.C. § 103

Claims 1-5, 7-12, 18-19, 20-24, 26-30, 33-42 and 46-51 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Collison et al.* (U.S. Patent No. 6,203,657) in view of *Langan et al.* (U.S. Patent No. 5,413,670). Applicants respectfully traverse the rejection.

Claim 1 recites the limitations of (i) ionizing a gas compound of an electro-negative etch species in a secondary plasma chamber and (ii) producing free electrons in a substrate processing chamber so as to convert molecules of the etch species into ions of the etch species by electron attachment. To the contrary, *Collison et al.* discloses dissociating a feed gas of oxygen and water vapor into species including electrons in a plasma processing chamber prior to the species of the feed gas flowing into a substrate processing chamber where a substrate is located. There is no separate act taught in *Collison et al.* of producing free electrons in the substrate processing chamber. On the other hand, *Langan et al.* discloses only a single chamber where an NF_3 plasma is generated. Therefore, *Collison et al.* and *Langan et al.*, either alone or in combination, fail to teach, show or suggest each and every limitation in claim 1, and this failure precludes the references from rendering the claim obvious. Accordingly, Applicants submit that claim 1 and claims 2-5, 7-12, 18-19, 60 and 62, dependent on claim 1, are in condition for allowance and respectfully request withdrawal of the § 103(a) rejection of these claims.

Applicants further traverse the rejection of dependent claim 2, which recites the limitation that producing free electrons includes introducing into the substrate processing chamber an electron donor gas and ionizing the electron donor gas. By contrast, *Collison et al.* discloses only that an additional feed gas (e.g., a fluorine containing species such as NF_3) is injected into the substrate processing chamber. The N_2 additive that the Examiner refers to in the office action as satisfying the "claimed electron donor gas" is actually used in conjunction with Cl_2 and HBr in a poly etch application that is separate from the invention disclosed in *Collison et al.* In fact, *Collison et al.* teaches that the additional feed gas containing fluorine is used in the invention to strip the residues of Br, Cl, and N that are formed during the separate poly etch process. Accordingly, Applicants request withdrawal of the rejection to claim 2 and allowance of the claim.

Applicants further traverse the rejection of dependent claims 4 and 5, which recite that the electro-negative etch species, which pass from the secondary chamber into the substrate processing chamber, include a member of the halogen chemical group. In contrast, the NF_3 that the Examiner refers to in the office action is injected directly via additional feed gas ports into the substrate processing chamber where the substrate is located. Accordingly, Applicants request withdrawal of the rejection to claims 4 and 5 and allowance of these claim.

Claim 20 recites the limitations of (i) ionizing in a secondary plasma chamber a stable gas compound of an electronegative etch species to produce plasma products and (ii) ionizing by electron attachment in a substrate processing chamber molecules of the electronegative etch species by introducing an electron donor gas into the substrate processing chamber and ionizing the electron donor gas to produce free electrons. As discussed in regards to claims 1 and 2 above, *Collison et al.* discloses dissociating a feed gas of oxygen and water vapor into species including electrons in a plasma processing chamber prior to the species flowing into a substrate processing chamber where a substrate is located and fails to disclose introducing an electron donor gas into the substrate processing chamber. On the other hand, *Langan et al.* discloses only a single chamber where an NF_3 plasma is generated. Therefore, *Collison et al.* and *Langan et al.*, either alone or in combination, fail to teach, show or suggest each and

every limitation in claim 20, and this failure precludes the references from rendering the claim obvious. Accordingly, Applicants submit that claim 20 and claims 21-24, 26-30 and 63, dependent on claim 20, are in condition for allowance and respectfully request withdrawal of the §103(a) rejection of these claims.

Claim 33 recites the limitations of (i) furnishing into a substrate processing chamber products produced in an external source by ionizing a stable gas compound of an electronegative etch species and (ii) ionizing molecules of the electronegative etch species by electron attachment in the substrate processing chamber. As discussed in regards to claims 1 and 2 above, *Collison et al.* discloses dissociating a feed gas of oxygen and water vapor into species including electrons in a plasma processing chamber prior to the species flowing into a substrate processing chamber where a substrate is located and fails to disclose ionizing the feed gas in the substrate processing chamber by electron attachment. On the other hand, *Langan et al.* discloses only a single chamber where an NF₃ plasma is generated without the use of an external source to ionize the NF₃. Therefore, *Collison et al.* and *Langan et al.*, either alone or in combination, fail to teach, show or suggest each and every limitation in claim 33, and this failure precludes the references from rendering the claim obvious. Accordingly, Applicants submit that claim 33 and claims 34-42, 46-51, 61 and 64, dependent on claim 33, are in condition for allowance and respectfully request withdrawal of the § 103(a) rejection of these claims.

Claims 6 and 25 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Collison et al.* in view of *Langan et al.* and further in view of *Higuchi et al.* (US Patent No. 5,783,492). Claim 45 is rejected under 35 U.S.C. § 103(a) as being unpatentable over *Collison et al.* in view of *Langan et al.* and further in view of *Aoki et al.* (U.S. Patent No. 5,581,874).

Applicants respectfully submit that claims 6, 25 and 45 are patentable over the cited references based at least on the traversal described above regarding the independent claims that these claims depend. Thus, Applicants respectfully request withdrawal of the rejection and allowance of these claims.

Allowable Subject Matter

Claims 13-17, 31-32 and 43-44 stand objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Applicants respectfully submit that claims 13-17, 31-32 and 43-44 are patentable over the cited references based at least on the traversal described above regarding the independent claims that these claims depend. Thus, Applicants respectfully request withdrawal of the objection and allowance of these claims.

Conclusion

The secondary references made of record are noted. However, it is believed that the secondary references are no more pertinent to the Applicant's disclosure than the primary references cited in the office action. Therefore, Applicant believes that a detailed discussion of the secondary references is not necessary for a full and complete response to this office action.

The references cited by the Examiner, alone or in combination, do not teach, show, or suggest the invention as claimed. Having addressed all issues set out in the office action, Applicants respectfully submit that the claims are in condition for allowance and respectfully request that the claims be allowed.

Respectfully submitted,



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